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Applicant: HONEYWELL INTERNATIONAL INC.

Claims

1. A turbocharger having an exhaust housing (7; 107; 207; 307; 507) and a variable nozzle device comprising vanes (27; 127; 227; 327; 527) interposed in a nozzle between a nozzle element (21; 121; 221; 321; 521) and a floating insert (17; 117; 217; 317; 517) being supported axially slidably with respect to said exhaust housing (7; 107; 207; 307; 507); wherein the floating insert is urged against the vanes (27; 127; 227; 327; 527) by a biasing member (43; 143; 343; 543),

characterised in that

the nozzle element (21) is elastically clamped between a step portion (25) of an inner periphery of the exhaust housing (7; 107; 207; 307) and a disc-shaped member supported on a center housing (1) of the turbocharger.

2. A turbocharger according to claim 1, wherein the floating insert is urged against the vanes (27; 127; 227; 327) of said vane area by a difference in the pressure in an exhaust gas inlet and the nozzle.

3. A turbocharger according to claim 2 or 3, wherein said biasing member is a spring washer (43; 143) placed in a recess (41; 141) formed in a gas outlet shroud portion (19; 119) of the exhaust housing (7; 107; 207; 307; 507).

4. A turbocharger arrangement according to any one of claims 1 to 3, wherein said biasing member is a spring washer placed in a recess (341) formed in said floating insert (317).

5. A turbocharger arrangement according to claim 4, wherein said floating insert (317) is formed of a sheet metal and has a C-shaped cross-section which, together with the exhaust housing (7; 107; 207; 307), defines said recess (341).
6. A turbocharger arrangement according to any of claims 3 to 5, wherein said recess (41; 141; 341) is communicated to the exhaust gas inlet of said exhaust housing (7; 107; 207; 307).
7. A turbocharger arrangement according to one of the preceding claims, wherein the nozzle element (21; 121) is abutted against said exhaust housing (7; 107; 207; 307; 507) by means of first spacer elements (145; 245; 345) passing through the floating insert (17; 117; 217; 317; 517).
8. A turbocharger arrangement according to any of the preceding claims, wherein the floating insert (17) is abutted against a second spacer element (45) by said biasing member, said second spacer element (45) being supported on the nozzle ring (21).
9. A turbocharger arrangement according to any of the preceding claims, wherein a piston ring (39; 139; 339) is provided between the floating insert and a gas outlet shroud portion (19; 119; 319) of the exhaust housing (7; 107; 207; 307).
10. A turbocharger arrangement according to claim 9, wherein the piston ring (39; 139; 339) is received in an annular recess either of said floating insert or said exhaust housing (7; 107; 207; 307).

11. A turbocharger having an exhaust housing (7; 107; 207; 307; 507) and a variable nozzle device comprising vanes (27; 127; 227; 327; 527) interposed in a nozzle between a nozzle element (21; 121; 221; 321; 521) and a floating insert (17; 117; 217; 317; 517) being supported axially slidably with respect to said exhaust housing (7; 107; 207; 307; 507), and a spring member (543) for urging the floating insert (517) against the vanes (527),
characterised in that

said spring member acts on a flange (518) of said floating insert (517) which is interposed between the exhaust housing (507) and a center housing (51) of the turbocharger in a floating manner.

12. A turbocharger according to claim 11, wherein the floating insert (517) is prevented from rotating relative to said center housing (51) and relative to said exhaust housing (507) by a locking means (537).

13. A turbocharger according to claim 11 or 12, wherein the floating insert is urged against the vanes (27; 127; 227; 327) of said vane area by a difference in the pressure in an exhaust gas inlet and the nozzle.

14. A turbocharger according to any one of claims 11 to 13, wherein said spring member is a spring washer (43; 143) placed in a recess (41; 141) formed in a gas outlet shroud portion (19; 119) of the exhaust housing (7; 107; 207; 307; 507).

15. A turbocharger arrangement according to any one of claims 11 to 14, wherein said spring member is a spring washer placed in a recess (341) formed in said floating insert (317).

16. A turbocharger arrangement according to claim 14 or 15, wherein said recess (41; 141; 341) is communicated to the exhaust gas inlet of said exhaust housing (7; 107; 207; 307).

17. A turbocharger arrangement according to any one of claims 11 to 16, wherein the nozzle element (21) is elastically clamped between a step portion (25) of an inner periphery of the exhaust housing (7; 107; 207; 307) and a disc-shaped member supported on a center housing (1) of the turbocharger.

18. A turbocharger arrangement according to any one of claims 11 to 17, wherein the nozzle ring (21; 121) is abutted against said exhaust housing (7; 107; 207; 307; 507) by means of first spacer elements (145; 245; 345) passing through the floating insert (17; 117; 217; 317; 517).

19. A turbocharger arrangement according to any one of claims 11 to 18, wherein the floating insert (17) is abutted against a second spacer element (45) by said spring member, said second spacer element (45) being supported on the nozzle ring (21).

20. A turbocharger arrangement according to any one of claims 11 to 19, wherein a piston ring (39; 139; 339) is provided between the floating insert and a gas outlet shroud portion (19; 119; 319) of the exhaust housing (7; 107; 207; 307).

21. A turbocharger arrangement according to claim 20, wherein the piston ring (39; 139; 339) is received in an

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annular recess either of said floating insert or said
exhaust housing (7; 107; 207; 307).